

### **REMARKS/ARGUMENTS**

These remarks are made in response to the Office Action of September 22, 2008 (Office Action). As this response is timely filed within the 3-month shortened statutory period, no fee is believed due. However, the Examiner is expressly authorized to charge any deficiencies to Deposit Account No. 50-0951.

### **Claim Rejections – 35 USC § 101**

Claims 17-20 were rejected under 35 U.S.C. §101 because it was asserted that the claimed invention is directed to non-statutory subject matter. More specifically, it was asserted that the claims do not have a useful, tangible, and concrete output.

According to "Interim Examination Guidelines for Determining Subject Matter Eligibility of Patent Applications," the first step in analysis under 101 is to figure out whether the claim is directed toward at least one of the enumerated subject matter categories - process, machine, manufacture or composition of matter. The "useful, tangible, and concrete output" test is only used when the claim is directed to one of the judicial exceptions (law of nature, natural phenomena or abstract idea). Since Claims 17-20 are clearly directed to a process which is one of the enumerated subject matter categories, the "useful, tangible, and concrete output" test does not apply. It is also noted that the Federal Circuit concluded in *In re Bilski*, \_\_\_ F.3d \_\_\_ (Fed. Cir. 2008)(*en banc*) that the "useful, concrete and tangible result" inquiry is inadequate and reaffirmed that the machine-or-transformation test outlined by the Supreme Court is the proper test to apply.

Nevertheless, the preamble of Claim 1 has been modified to specifically recite that the method of the present invention is used during natural language processing in order to facilitate prosecution of the instant application.

Applicants thus respectfully request that the claim rejections under 35 U.S.C. § 101 be withdrawn.

### **Claim Rejections – 35 USC § 103**

Claims 17-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 4,873,634 to Frisch, *et al.* (hereinafter Frisch) in view of U.S. Patent 5,754,972 to Baker, *et al.* (hereinafter Baker).

Applicants respectfully disagree with the rejections and thus have not amended the claims to overcome the art rejections.

### **Aspects of Applicants' Invention**

It may be helpful to reiterate certain aspects of Applicants' invention prior to addressing the cited references. One embodiment of the invention, as typified by amended Claim 17, is a computer-implemented method of performing morphological analysis on a text string in natural language processing.

The method can include selecting whether or not to decompose a decomposable complex word in response to a request from an application making use of a result of the morphological analysis (see, e.g., Specification, paragraphs [0044] and [0055]); inputting the text string to be processed; and decomposing the text string into tokens. When it is selected not to decompose a decomposable complex word, the method can further include determining whether each token is decomposable; if the token is not decomposable, registering the token on a token list; and selecting the optimum token string on the basis of the token list. See, e.g., Specification, paragraphs [0055] to [0064]; see also Fig. 6.

*The Claims Define Over The Prior Art*

There are structural differences between the present invention and Frisch.

In Japanese and other languages, all words in a sentence are the subject of agglutination. It is not as simple as German compound words, where they have only small numbers of attributes (Frisch, col. 4, lines 11-12: (1) stand-alone, (2) a front component, (3) a middle component, (4) a back component) that appear within only single noun words. In Japanese and other languages, there are approximately a hundred attributes to represent grammatical features of words in a sentence, and they are allowed to agglutinate in flexible order sequence within a sentence. Those compound words do not appear stand-alone in a sentence; rather they are agglutinated with preceding and following words (e.g. adjective, verb, particle, and so on). Therefore the ambiguity and the number of candidate sequences become much higher what can be handled by Frisch. The morphological analysis for such languages needs to calculate the optimal token sequences including compound words from the inputted agglutinated sentence.

It might appear possible to use Frisch's invention for such agglutinative languages too. However, it is practically impossible due to the large number of candidate sequences to examine. Frisch recognizes that there are combinational numbers of candidates (Frisch, col. 4, lines 57-61: "Many ambiguous cases ('sun-spots', 'suns-pots') will be resolved by the decomposition process on the basis of the compounding attributes found in the dictionary, but some words may have more than one set of acceptable components."). Since Frisch simply examines all of them one by one (Frisch, col. 4, lines 61-64: "Since the process is recursive and requires constant access to the dictionary, the computer time required to decompound a word depends on the degree of the branching of the compound word."), it takes a long time to compute the result if the character sequence becomes long (Frisch, col. 4, lines 64-67: "The degree of branching is proportional to the length of the compound word and to the length of the components in the dictionary.").

Therefore, Frisch is not applicable for Japanese and other languages. Due to the high agglutination, it is necessary to compute the whole sentence, which is much longer than a single compound word that Frisch operates on, to decompose a word. Frisch discusses a technique to reduce computing time by eliminating entries in the dictionary (Frisch, col. 4, line 67 – col. 5 line 7: "The degree of branching, and execution time, can be reduced by eliminating from the dictionary short words ..."). However, this is not applicable to process Japanese and other languages. Frisch's invention is only effective for processing short character sequence such as single compound word of German and others.

To operate on the ambiguities of Japanese and other languages, the best mode for carrying out the present invention uses HMM (Hidden Markov Model) to restore the hidden sequence of constitution words under the inputted sentence by applying a dynamic programming algorithm (Viterbi algorithm). One characteristic of Japanese and other languages is that both the grammar governing the whole sentence and inside a compound word are the same. The present invention utilizes this characteristic. The Viterbi algorithm refers to "token list" to get all the possible token candidates in a sentence. By introducing the "decomposable flag" and controlling whether to add this word to the "token list" or not according to the flag, same morphological analyzer becomes capable of yielding "token sequence with compound words" or "token sequences with decomposed words." That enables the present invention to produce both decomposed result and compound result with efficient and rapid operation because it does not require an explicitly dedicated decomposer as Frisch does for the decomposition processing only.

Furthermore in the case of yielding both results for "token sequence with compound words" and "token sequences with decomposed words," the dictionary entries remain on the "token list" after the first processing. So just filtering the same "token list" and running the same morphological analyzer again is enough to yield the

second result. This is an efficient and rapid operation. Frisch is not capable of this kind of processing.

The other cited references do not make up for the deficiencies of Frisch as discussed above.

Accordingly, the cited references, alone or in combination, fails to disclose or suggest each and every element of Claim 1, as amended. Applicants therefore respectfully submit that amended Claim 1 defines over the prior art. Furthermore, as each of the remaining claims depends from Claim 1 while reciting additional features, Applicants further respectfully submit that the remaining claims likewise define over the prior art.

Applicants thus respectfully request that the claim rejections under 35 U.S.C. § 103 be withdrawn.

### **CONCLUSION**

Applicants believe that this application is now in full condition for allowance, which action is respectfully requested. Applicants request that the Examiner call the undersigned if clarification is needed on any matter within this Amendment, or if the Examiner believes a telephone interview would expedite the prosecution of the subject application to completion.

Respectfully submitted,  
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